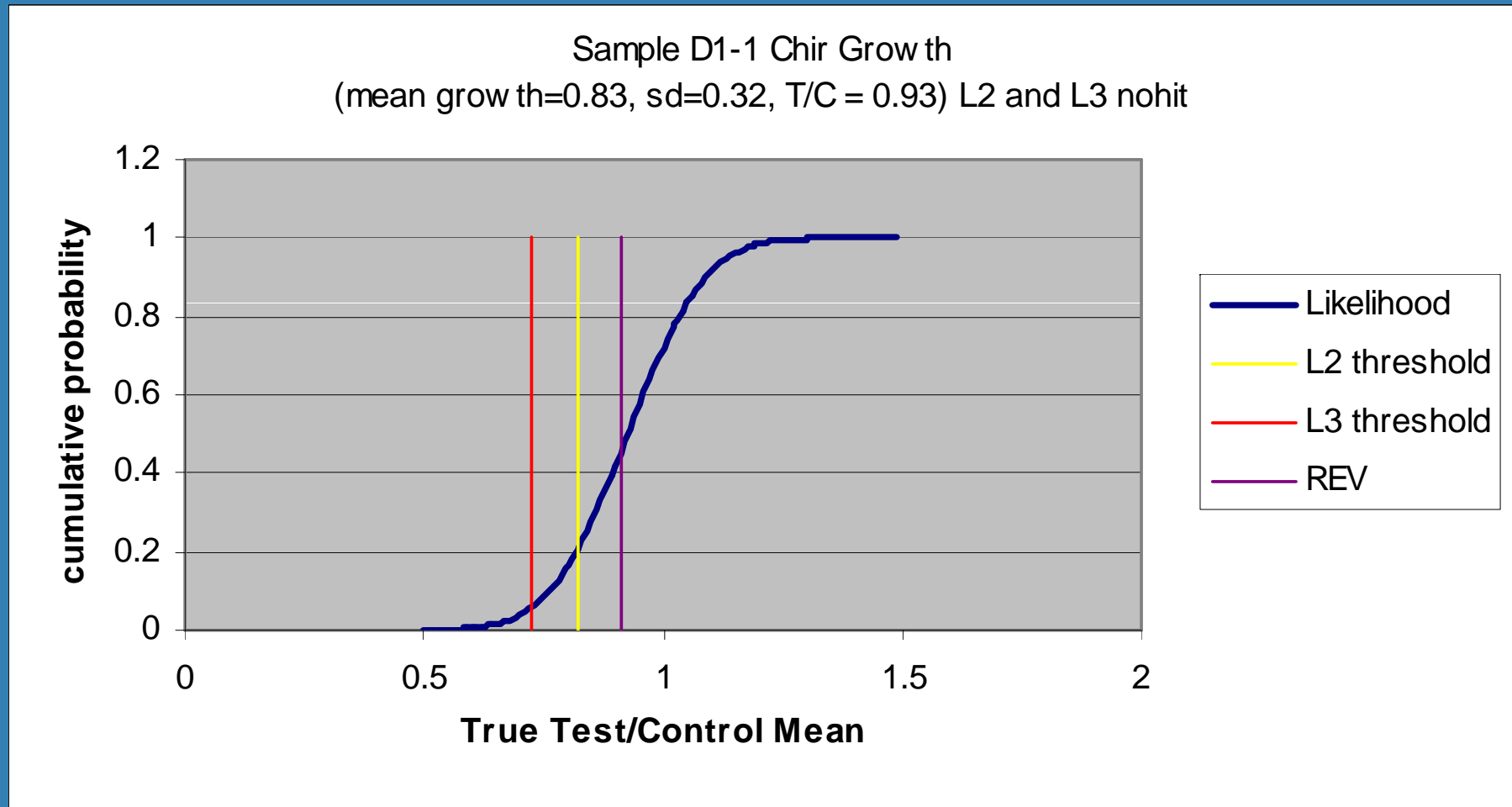# Comprehensive Benthic Approach
Supplemental Material:
Hit Classification Uncertainty Analysis

Benthic Toxicity Check-In

September 22, 2010

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Hit Classification Uncertainty Analysis

- Based on bioassay replicate variability
- Also did a sensitivity analysis on control variability

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Hit Classification Uncertainty

Sample D1-1 Chir Grow th
(mean grow th=0.83, sd=0.32, T/C = 0.93) L2 and L3 nohit

Example distribution of the probability of a range of *T/C* responses for a particular sample from the Study Area.
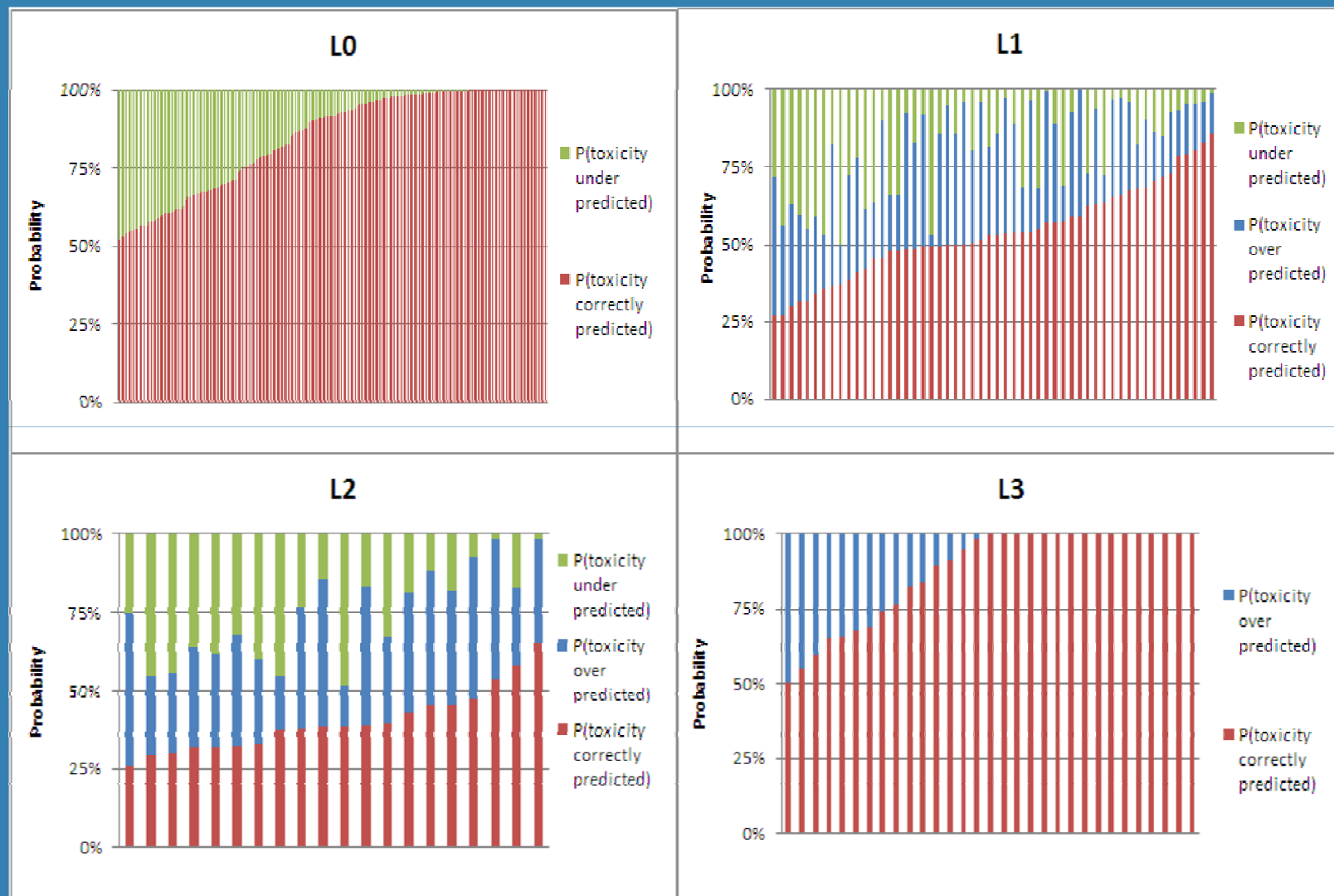
Stacked bar graphs of probabilities that toxicity is correctly predicted, under-predicted, or over-predicted based on Bayesian posterior probabilities for the *Chironomus* survival endpoint. Each bar represents a Portland Harbor bioassay station (note that is not possible for L0 to be an over-prediction or for L3 to be an under-prediction).
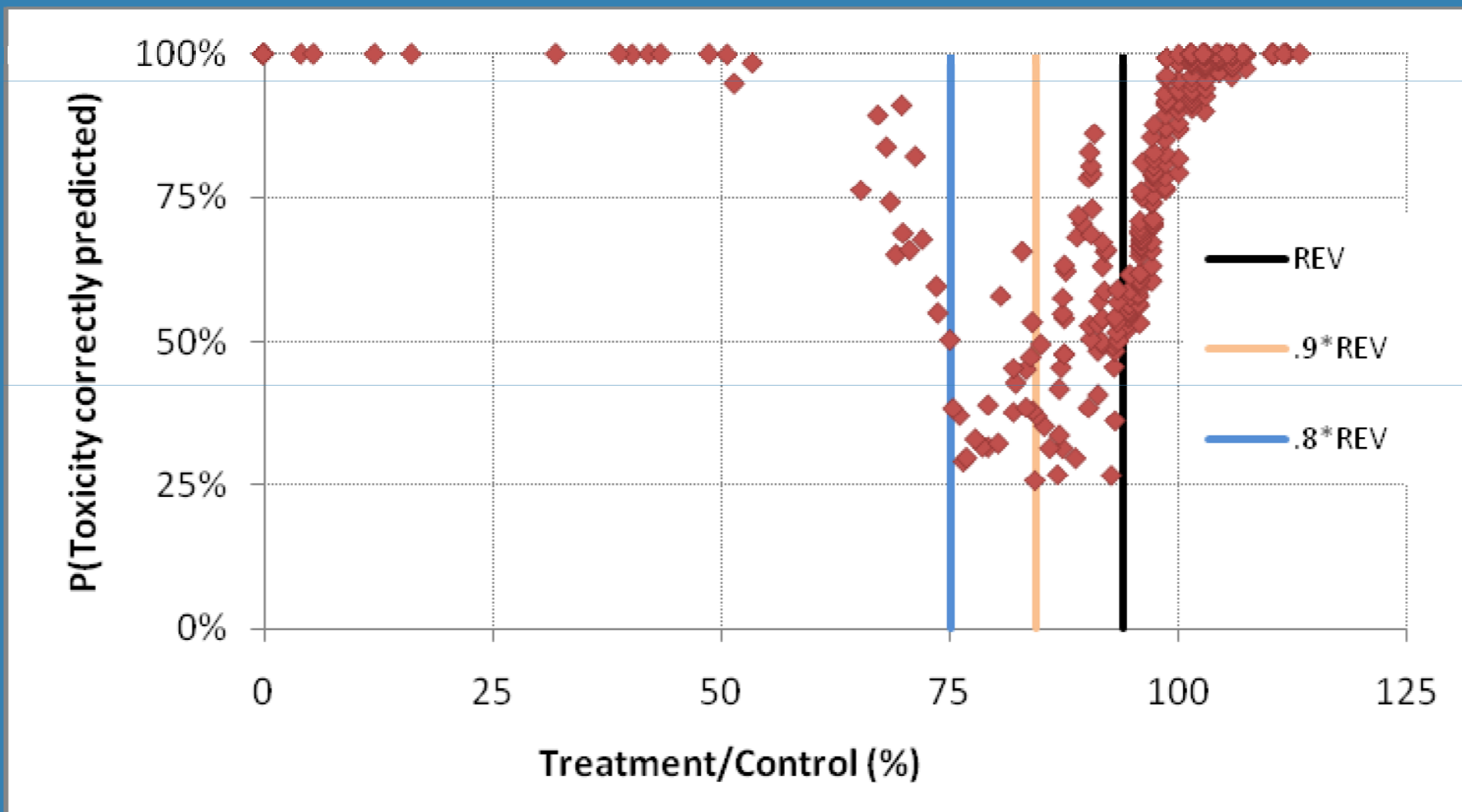
Probability of correctly predicting bioassay hit classification as a function of the empirical bioassay response level for *Chironomus* survival. Each dot represents a Portland Harbor bioassay station.

Likelihood Function

- Uncertainty due to variance in test response

$$-\ln L(\mu \mid X, s^2) = \sum_{i=1}^{8} \ln\left(s\sqrt{2\pi}\right) + \frac{(X_i - \mu)^2}{2s^2}$$

X_i = observed value for the ith replicate.

μ = true mean being evaluated

s = standard deviation of the 8 observed replicates